

# THE macdonald JOURNAL

APRIL 1976





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# THE macdonald JOURNAL

APRIL 1976

Macdonald Journal  
Volume 37, No. 4  
April, 1976

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The Macdonald Journal is published every month by Macdonald College.

Material in this issue may be reprinted editorially without permission; however, credit to the Macdonald Journal would be appreciated. Address all inquiries re editorial matter, advertising, and subscriptions to: The Editor, Box 237, Extension Department, Macdonald College, Quebec, H0A 1C0. Second class mail registration number 0463.

Subscription rates are \$3.00 for one year, \$5.00 for two years, and \$7.00 for three years in Canada. Outside Canada — \$7.00 for two years.

Printed by Harpell's Press Co-operative, Gardenvale, Quebec.

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## Journal Jottings

If you can honestly say "it has only happened to me once or twice," then possibly you can skip our lead article in this issue. Obviously you haven't lost precious time — nor your temper! But if you can't remember the number of times that a piece of machinery has broken down out in the field, you've had to stop work, drive to town for a part — and hope that it's in stock — drive back, repair the equipment, and finally get back to work, then may I suggest that you read "Preventive Maintenance of Farm Machinery."

When I asked Professor Norris how a farmer can fit preventive maintenance into his already busy

schedule, his reply was, "I don't think it's a question of fitting it into his busy schedule. It's a question of putting it into the schedule to make himself less busy." Taking time to read this article could be the first step in your schedule. I hope it saves time — and tempers — in the long run.

This article plus the one by Professor Ogilvie, "Animal Manure Recycling: Engineering Aspects" are not only timely but also fit in with the fact that the International Salon of Farm Machinery is being held at Place Bonaventure in Montreal from April 22 to 25. Macdonald College plans to have a display at the Salon; if you're in, drop by and say hello.

For an update on what is happening to the Macdonald Journal be sure to read Gordon Bachman's editorial.

Hazel M. Clarke.

Just in case your eye happened to miss it, turn back to the first page and you will see that we have changed publishers. After many years of working closely with Ronald J. Cooke, Ltd., we have decided to venture forth and become our own publisher. Primarily, we have taken this decision because of financial reasons. Because of increases in printing and paper costs it has become necessary for us to reduce our internal costs as much as possible.

I want to emphasize, however, that this in no way means that we are intending or will be forced to cut back on the quality of the Macdonald Journal. In fact, we are

anticipating just the contrary. We look upon this change as being one of many we have made or plan to make in order to better ensure that the Journal will more closely match your needs and interests.

For example, the people at the Quebec Ministry of Agriculture in their Family Farm pages have recently made some changes in presenting new information of interest to farm producers in Quebec. The feedback we have received has been enthusiastic and encouraging. Most of the people we have heard from want more of this type of information. In the same manner, we at

Macdonald College are considering ways of getting farm information into your hands in the form you feel most useful and relevant. This may involve more agricultural content or shorter articles, or some other changes. We would like to hear from you as to the type of information you would like to receive in the Journal. If in the future issues of the Journal you find articles that you particularly like or dislike, why not take a minute to drop us a line and let us know. We would like to know what's on your mind and what you would like to read in the Journal.

Gordon Bachman.

## "Opportunities '76 — Agriculture"

The Hon. Eugene Whelan, Federal Minister of Agriculture, along with a number of other leaders in Canadian agriculture, will speak at the "Opportunities '76 — Agriculture" Conference. This annual one-day conference is sponsored by the Department of Agricultural Economics of Macdonald College.

The conference will be held in Place Bonaventure on April 23rd, with the cooperation of several agricultural organizations and in conjunction with the International Salon of Farm Machinery. It will provide up-to-date information to the agricultural sector and will pinpoint profitable opportunities in this production year.

Mrs. Beryl Plumptre, Vice Chairman of the Anti-Inflation Board, will clarify what the effects of the Anti-Inflation Policy will be on the agricultural sector.

Speakers on dairy, beef, hogs, feed, and poultry will provide expert insight into areas of concern

to farm and agri-business managers.

It is a great opportunity to get answers and we urge you to take advantage of this conference. Instantaneous translation provided, and proceedings will be available in both languages.

We regret that we will only have room for 350 people and urge those concerned to register early. The registration fee is \$20, which includes admission to Salon and conference, as well as proceedings in either language.

For more information and registration: write: — "Opportunities '75 — Agriculture", Dept. of Agricultural Economics, Box 224, Macdonald College, Quebec, H0A 1C0. Tel.: 1-514-457-6580.

Peter G. Terauds,  
Conference Coordinator,  
Dept. of Agricultural Economics.

P.S. ALMOST EVERYTHING BEGINS ON THE FARM.



# Preventive Maintenance of Farm Machinery

(An interview with Professor Eric Norris of the Department of Agricultural Engineering. The questions, by Hazel Clarke, will appear in italics.)

*Why is preventive maintenance important?*

**Professor Norris:** Preventive maintenance is important to the farmer for three reasons. First, it can minimize costly failures in the middle of a busy season. Second, good preventive maintenance can reduce operating costs because the machinery works more efficiently, uses less fuel, and takes less time to do a job. Third, well-maintained equipment is safer to operate. A machine with loose bolts, loose fenders — this is an extreme case — is in a dilapidated condition that presents more hazards to the operator.

*How can a farmer fit preventive maintenance into his already busy schedule?*

**Professor Norris:** I don't think it's a question of fitting it into his busy schedule. It's a question of putting it into the schedule to make himself less busy. A good preventive maintenance schedule for major pieces of equipment saves more time than it consumes. It may take a little effort to set up a system that works. The farmer may think it's a pain in the neck to have to do these things on a regular basis, but in the end he is going to find that regular maintenance takes less time in total than irregular haphazard maintenance and saves time in actual operations because of fewer breakdowns and faster operation when the machine is operating. If the farmer wants help in setting up a good preventive maintenance schedule

for equipment, he has many sources of information. The first source is his operator's manual. A manual for a new tractor very likely will have a schedule of recommended preventive maintenance similar to the recommended preventive maintenance for a new automobile.

Many people follow the schedule they get for a new automobile and take it in to the shop every 4,000 or 6,000 miles to get various things done. Or if they are mechanically inclined, they perform the list of operations listed for each of these mileages. The same thing should be done for a tractor or any other piece of equipment. If the operator's manual does not provide this kind of information, let us say for an older tractor, there are other sources of information to set up a good schedule of maintenance. The Quebec Ministry of Agriculture puts out a large chart designed to be placed on the machinery shed wall near the tractor's parking spot. It has recommended maintenance procedures which should be performed after a certain number of hours of operation. This is handy because the chart provides space for you to check off and write in notations that are pertinent to the maintenance procedures that you performed. The John Deere Company puts out a manual on preventive maintenance which not only indicates what can be done in terms of preventive maintenance but also makes recommendations for the intervals at which certain operations should be done. The John Deere publication is quite unbiased in that it is not aimed specifically at its own brand of machinery.

*What parts of the machine need the kind of regular service that you are talking about?*

**Professor Norris:** The farm tractor and self-propelled implements are the pieces of equipment that really need the most preventive maintenance because they have an internal combustion engine and a power train, both of which are complex devices. Within the tractor and self-propelled machinery you have really got several separate areas to consider in terms of preventive maintenance. There is the engine in-take and exhaust system, the engine fuel system, the engine lubricating system, the engine cooling system, the electrical system, the power train, and most likely the hydraulic system. There are also other components to the machine, but these systems are the major ones that need reasonably regular service.

*Could you outline some of the things the farmer should do in the regular service of the systems you've just mentioned?*

**Professor Norris:** I can sketch a few of the things that he should be doing. I want to say right now that what I will say is not in any way complete, and the farmer should, if he wants to follow this up, get one of the publications I have mentioned and set up his own schedule. First, let us consider the in-take and exhaust system — the lungs of the engine. This is the system by which the engine breathes. On the in-take side of the engine there is the air cleaner for which regular service is essential. In ordinary operation, my recommendation is that the air cleaner should be checked daily, if the machine is being driven for a full eight-hour



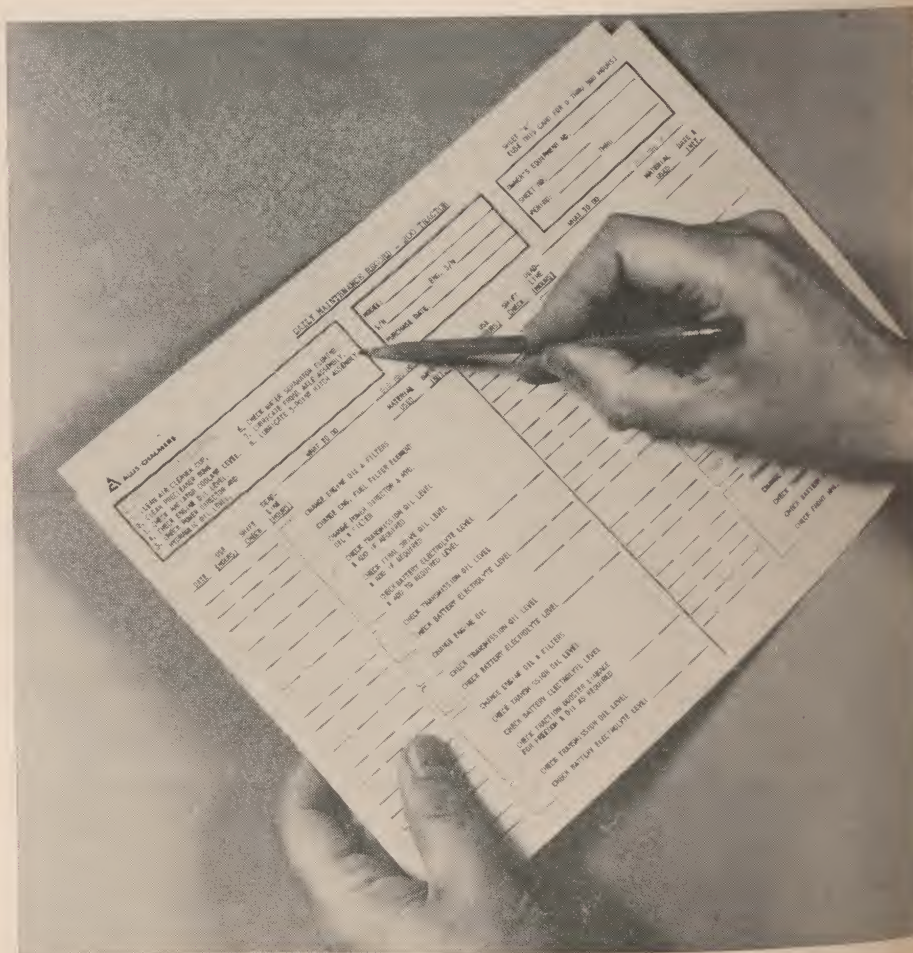
Some tractors have a turbo charger. The farmer himself can't service this, but he should check it occasionally by listening to hear if the bearings are working properly. The valves in the intake and exhaust system should be maintained properly. The clearance between the rocker arms and the valve stems should be checked periodically. If the clearance is not there, the exhaust valve, in particular, can be burnt which results in a costly valve job. In the exhaust system there is the exhaust manifold and the muffler. The muffler is really a major thing that a farmer should look at. A good original equipment muffler is a necessity. If the muffler is old and leaking gas, then the back pressure of the engine is not correct and power is lost. If it becomes clogged, you have the same situation; you are choking the engine with too much back pressure. The muffler should be replaced simply from a noise standpoint if it becomes defective.

Let's move on to the fuel system. In this part of the world there are two kinds of fuel systems: the gasoline or spark ignition engine and the diesel. I do not need to emphasize the need for cleanliness in both gasoline and diesel fuel handling. In the case of gasoline, the sediment bowl should be checked regularly and in the diesel engine the fuel filters should be replaced at the

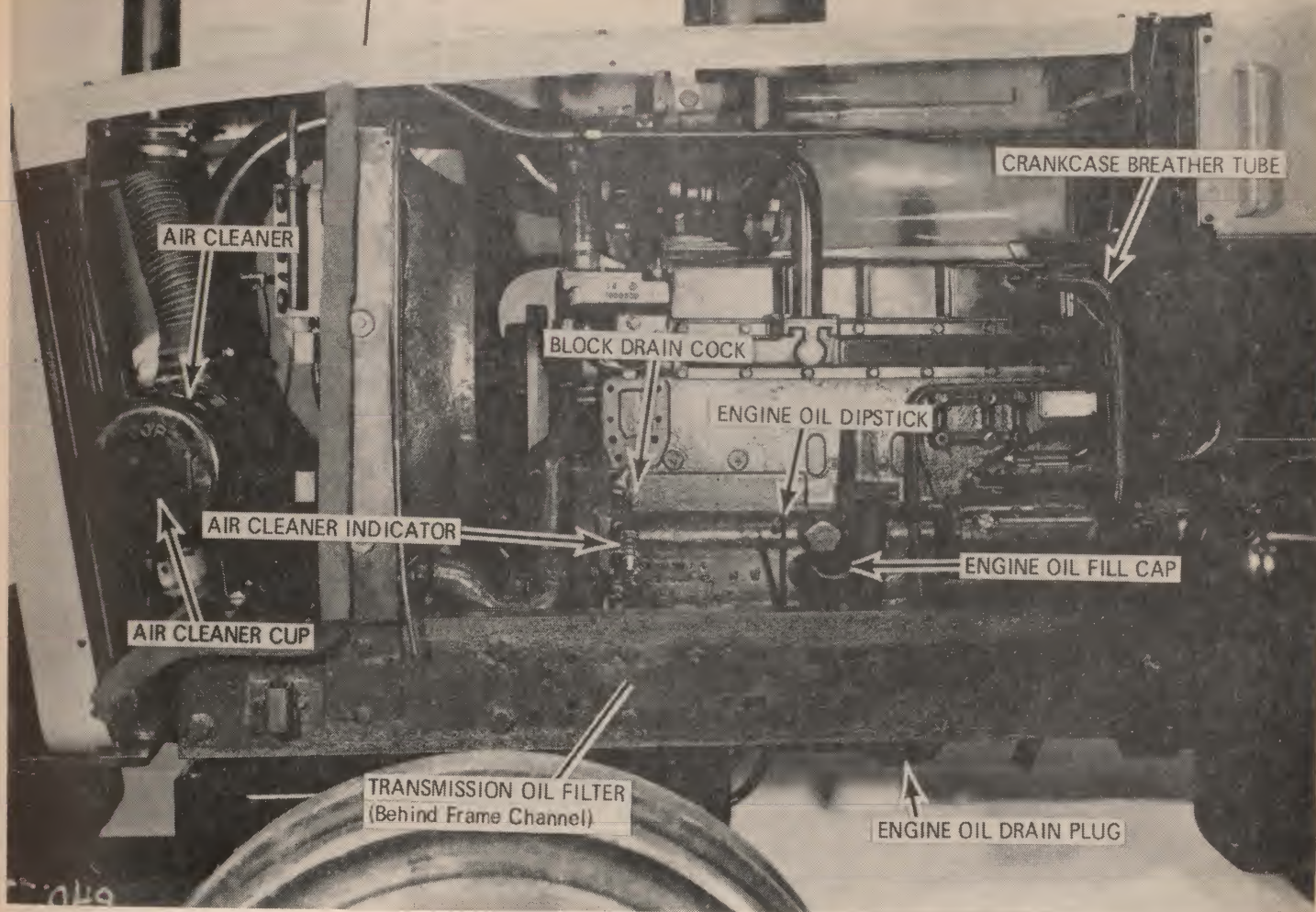
intervals specified by the manufacturer. In the case of the spark-ignition engine, the carburetor can be adjusted fairly easily by the operator. There are really only two adjustments. In present day tractors they have got it down to only one adjustment available on the carburetor. You can do a pretty good job of adjusting it by ear. In the case of the diesel engine, adjustment cannot be done by the farmer and it has to be taken to a service shop. Depending on the brand, the diesel injectors should be serviced by a qualified shop after every 600 to 1,000 hours of operation. The diesel engine has one extra little problem. If you should ever run out of fuel with the diesel engine, you are going to have to bleed the lines feeding the injectors. This can be a somewhat hazardous operation because the diesel fuel

fed to the injectors is under very high pressure, and should a small stream of it be directed against your skin under the pressure of the injection pump, the diesel fuel could actually penetrate the skin. A very nasty kind of inflammation can develop which, if not treated, can be very serious.

The engine lubricating system is the next thing to consider. And again common sense is important. Every 50 hours or week of full-time operation, the lubricating system should have the oil replaced with the proper grade of oil for the season of operation. This is all spelled out in the tractor's operation manual. The oil filter should be changed at the same time. Some manuals indicate that the filter may be used for two oil changes. The frequency of







changing the oil should be dependent on the type of operation. That is, if you are working under very dusty conditions or working under a situation where the tractor is lightly loaded and idling for long periods of time, the oil may become fouled faster and so changing the oil every 50 hours of operation may be too seldom. In winter operation oil changes should be more frequent. The lubricating system is very much inter-related with the next system to be considered — the so-called cooling system.

I think it would be much better named the temperature-regulation system because the cooling system, consisting of the radiator, water pump, thermostat, and all of the water jackets around the engine, keeps the engine at the proper temperature for operation. If the engine is too hot or too cold it doesn't operate efficiently. The cooling system and the lubricating system work hand in hand because the oil also within the lubrication system aids in the heat transfer — it transfers heat

from the very hot combustion chamber to the coolant in the water jacket. The cooling system should be checked quite often. The fan belt driving the fan moving the air through the radiator should be checked daily for cracks, for tightness, etc. The coolant, depending on how heavy the usage of the tractor, should be changed either every year or every second year — 500 to 1,000 hours of operation — and replaced with good quality anti-freeze and water. The water pump and thermostat should be checked periodically. The water pump bearings are usually the weak point; that becomes quite evident usually by a squeaking or a leak in the bearing.

The electrical system, of course, is more extensive in the spark ignition engine than the diesel engine. It entails both the ignition system and the accessories which are run by the electrical system. If a farmer has a sufficiently well-equipped shop, he can look after the electrical system and spark ignition engine himself. He can change spark

plugs, ignition points, and condenser quite easily, if he has a timing light and a dwell meter for this job. He would save time and money in the long run by obtaining the timing light and dwell meter for \$35.00 to \$40.00 maximum, plus a few ignition wrenches.

*The farmer should have a few spares on hand.*

**Professor Norris:** Yes, he really should. A well-equipped farm shop should have a bin of expendable parts, i.e., spark plugs, mower knife blades, filters, etc. These items are consumed fairly quickly and a farmer saves a lot of time if he has these in stock rather than having to drive 40 miles to town to get the part when he needs it.

One of the things I found while working as a mechanic's helper in a machine shop is that we had a very difficult time trying to sell a new set of ignition wires to farmers. After 2,000 or 3,000 hours in operation the wiring



harness on a tractor is worn out even if it doesn't appear so. The insulation, under the influence of weather, grease, oil, sand, and time, gradually breaks down. The spark which reaches the spark plug is just not as strong and you are losing a lot of money by poor fuel economy.

Power train maintenance is not something the farmer does very much about. In some cases he may be involved with looking after the oil changes, if there is a torque converter or automatic transmission in the tractor but this is usually shop serviced. The farmer should keep a very close eye on the hydraulic system. Here again you come up against filters. Usually there is a filter in the hydraulic system which should be replaced at regular intervals — maybe 200, 500, or 1,000 hours — depending on the piece of equipment. The \$5 worth of filter should be changed at regular intervals otherwise the farmer's going to be replacing a \$150 hydraulic pump. As needed, hoses, etc., should be replaced when they show signs of wear.

Those are the major systems within tractors and self-propelled machines that should be given regular maintenance. I cannot emphasize too much the need for hanging a chart on the wall beside the equipment. A little tip here: it is probably easier to do this kind of thing at night even though you are tired. The temptation in the morning is to get on the tractor and get the job done. It is probably a personal preference thing but if the farmer finds that he just cannot bring himself to stay in the shop for 10 minutes to do the daily maintenance in the morning, then he had better force himself to do it in the evening.

The schedule of tasks is fairly

easy to remember because no matter what the source, either the operator's manual, the John Deere service manual, or the Quebec Ministry of Agriculture recommendations, the service intervals are in multiples of days, or weeks, or hours. For example, there are certain daily service operations, then there are weekly ones and each week you do the weekly service operations plus that day's as well. Then there are monthly service operations, so at the end of the month you do the monthly service, plus the weekly service and the daily ones. Then there is the seasonal service, i.e., every two-three months, so you do all of the servicing. If the tractor or piece of equipment is not heavily used, then you are better to go to a service schedule based on hours. That is there is service every 10 hours of operation. There's a 50-hour, 100-hour, 250-hour, 500-hour, and 1,000-hour service operation. In a large commercial farm 1,000 hours would be about one year's operation and 10 hour's operation would be about a day. A farmer can set it up as he likes; the main thing is to set up a system that will work and save time.

If you are working with tillage equipment for two or three weeks straight, it should be checked daily. In the case of haying equipment, a baler, of course, requires greasing of various points every few hours of operation.

There is a type of service task which is specified in manuals in the "as required" category. This is common sense. Before you start up any piece of equipment in the morning you should walk once around it and just check whatever points you feel might be a problem. You will save yourself time in the end because if you don't find that loose bolt,

then you are going to be coming back from the field to put a new bolt in half way through the day. Chains, belts — all of these power transmission elements in equipment — should be checked daily for tightness and integrity.

*What about equipment that is left out in the fields or beside the barn? Should this equipment be in a machinery shed?*

**Professor Norris:** I definitely recommend a good farm machinery shed and a good farm machinery workshop to do repairs on every farm. If the equipment sits out in the weather all year, a farmer is paying for the shed he doesn't have. The machinery simply becomes less valuable. It is not very well documented as to whether it functions any less effectively for sitting out. There are certain things that sitting out in the weather can cause. Rust is very apparent. Although in certain areas rust does not hurt the function of the machine it does hurt your pocket-book when the time comes to trade the thing in or sell it at an auction sale.

It is very difficult to pin down an answer to the question: "does sitting out in the weather impede the function of the machine?" In certain instances it does and in others it doesn't. Plough shares covered with a good thick coating of grease would survive and do just as good a job of ploughing next year, but a baler left out without any protection may end up with the plunger seized in the machine and it will require a lot of work to get the thing started.

In general, I would have to say that the climate in this part of the world makes a machinery storage shed an absolute necessity.



# Animal Manure Recycling

## Engineering Aspects

by Professor J. R. Ogilvie,  
Department of Agricultural  
Engineering

### Introduction

Animal manure has become a boon to organic gardeners and a bane to others. Increasing emphasis on natural fertilizers means that animal manure must be better cared for than ever before. Mistreatment will result in losses of nitrogen by volatilization and losses of organic matter by oxidation. Beset by provincial environmental regulations many a commercial farmer, on the other hand, wishes he could make manure disappear.

Soil scientists tell us that applying more than 150 pounds of manure nitrogen per acre will be a waste of valuable nutrients. If you have to, they say, 300 pounds per acre could be applied but without greatly increasing yields. Beyond 300 pounds there is the risk of the excess nitrogen turning into nitrate and contaminating the groundwater. Such guidelines are used by Ontario at present and Quebec wants to use them in order to set the number of animals per tillable acre.

Manure as voided by animals is immediately subject to attack by microorganisms. Some of these microorganisms can work without oxygen. They break down the solid particles into more liquid forms. These liquid forms can yield nutrients more readily available to plants. Unfortunately, the more liquid forms so produced can have very offensive odours. If such manure is spread on land the odours are released. On the other hand, there are organisms which operate only in the presence of free oxygen. These organisms produce an odour-free material as the raw material is

oxidized. Such organisms are found in compost piles and on the outside of manure piles where straw has been used as bedding. Artificial aeration also makes use of aerobic organisms to control odours in and around buildings and on land spreading.

The agricultural engineer is charged with providing the facilities and equipment to bring about the conservation of this valuable resource, animal manure. In the past many of our operations were against conservation and some still are wasteful of nutrients. The spreading of manure on snow, especially on sloping ground, practically guarantees that there will not be any problems with manure in the spring for it will all be on the neighbour's land.

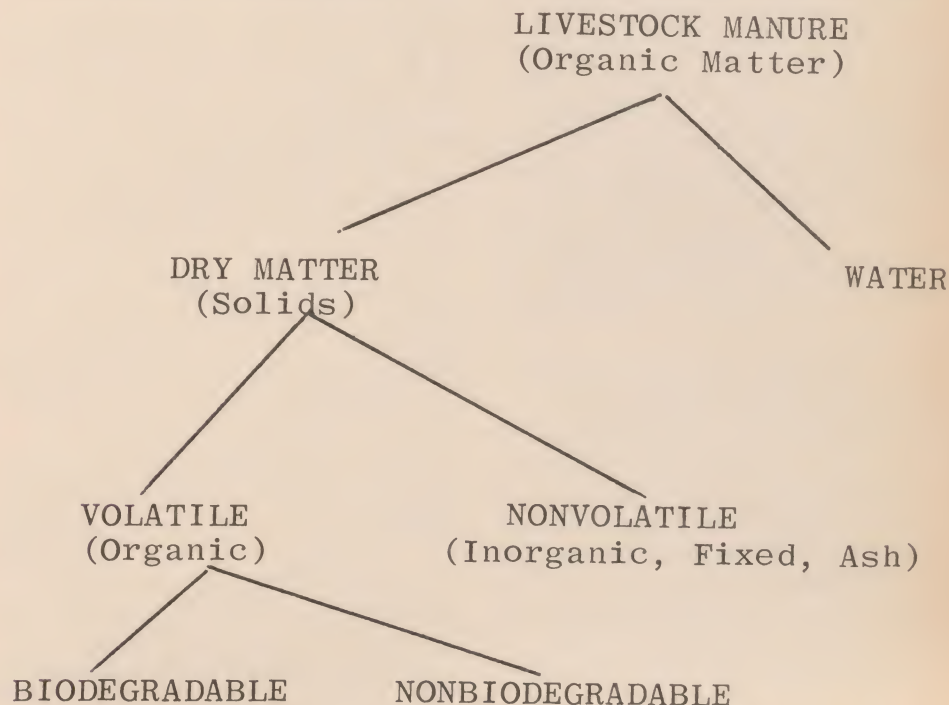
### Nature of Animal Manure

Livestock manure can be shown as made up of different divisions. The diagram, below, shows one possible breakdown by parts. These parts correspond very

closely to the way an aerobic microbe might look at the manure. In the first case a microbe is interested in the solid matter as a food source. He finds though that only the volatile portion is much use to him. The non-volatile portion is made up of salts that he cannot digest. As he starts chewing he also finds that only perhaps 50 per cent of the volatile material can be broken down by him into "microorganism food." The non-biodegradable portion remains in the soil, if spread there, and helps to make it more porous and workable. When all of the biodegradable portion is gone, the livestock manure is said to be stabilized. There are charts to give the chemical properties of manure from most farm animals.

### Solutions to the Problem of Manure Piles

For most of the dairy herds in Quebec, bedding is still available and "solid" manure is produced. A gutter cleaner collects the





manure and transports it to storage in a pile behind the barn. After storage in the pile for a long or short time, the semi-dry material is spread on land. Hopefully it can be ploughed under within 24 hours to stop the loss of ammonia.

In spite of the fact that piling has been standard practice for many years, it is wasteful of nutrients and usually yields pollution. Rain falling on the pile washes soluble materials out, usually into a nearby watercourse. New regulations will definitely try to stop this practice. One engineering solution might be useful. A simple pit dug in a water tight soil will hold the drainage water until it can be spread. A roof over the pile may prevent most washing action but there will be some drainage anyway and a pit is still necessary.

Recently some farmers have been successful with open top storages formed by surrounding a sloped concrete pad with walls. An opening left on the high side allows a tractor with a scoop to enter and load the manure into liquid tight spreaders. Drainage liquid is caught in the lower corner and taken by tanker to the field. An extension or stacker on the gutter cleaner ensures placing of fresh manure in the centre of the storage.

Some farms do not have enough space around the farmstead to store manure for the complete winter. If a location convenient to an all weather road can be found, a remote stack near the probable use area makes sense. Travel takes up a large portion of the time required to spread manure and such time is more available in the fall and winter. The remote site needs the same

safeguards against liquid runoff as required at the farmstead.

### Liquid Manure

Most of the swine herds and dairy free stall barns use little bedding. This results in a slurry manure which moves like a liquid. Manure piles cannot be formed and tanks are the only way to store such material. In most cases, underground concrete tanks have been built to store liquid manure for up to seven months. Keeping such semi-liquid manure in open top storages is also increasing.

A liquid manure handling system, while retaining nutrients, can cost a lot of money. The costs are mostly associated with the storage tanks but the service is hard on machinery too, so its life is not long.

The spreading of liquid manure presents problems with odour and time of year. Storage in tanks gives anaerobic conditions and release of odours on spreading. At the same time most farmers only have a short time in the spring during which they can spread manure on their land and still plant corn early. A field planted in corn is not available again until late September.

Presently we are researching methods of injecting manure slurry in land. Such injectors must be capable of placing manure in corn up to 18 inches high. The injector must have minimum effect on plant roots and provide good soil cover to prevent odour escape.

The rapid ploughdown method, used at the Animal Research Institute in Ottawa, results in odourless spreading of manure.

The number of tankers, say eight, that must be used to keep up with the plough means for most farmers a lot of tractor and plough idle time when they only have one tanker.

Most farmers with liquid manure use a broadcast spreader tanker. While there is a certain amount of nutrient loss to the air, the method is acceptable if the neighbours do not object. To capture nutrients, ploughdown within 24 hours is required. Broadcasting can also be done onto grassland but the loading rate must be cut back to prevent burning.

### Aeration

Aeration of animal manure is to be considered when farmers have:

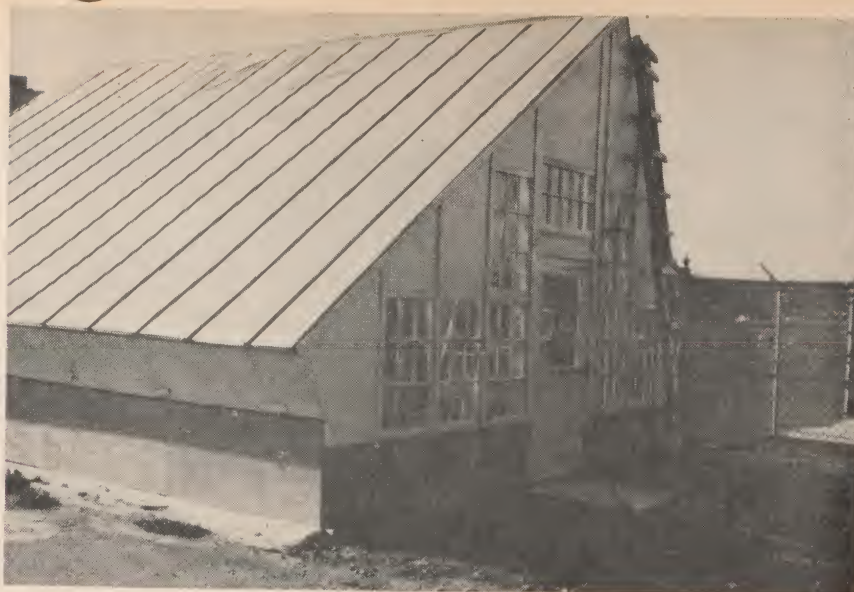
- A. Problems with neighbours who object to odours released when stored manure is spread on land.
- B. Problems with manure odours or toxic gases from manure stored under slatted floors.

Aeration removes odours but at quite an increased cost compared to storage without aeration.

The object of aeration is to encourage oxygen using organisms, for example bacteria, to breakdown the solids in manure into simpler compounds like carbon dioxide and water. Even if all the solids are not broken down, they are at least more stable and will not cause odours on spreading. The odour of manure undergoing aerobic treatment has a smell like damp earth.

Oxygen is the chemical element which must be added to the liquid manure mixture. This is added by





one of several methods. Here are three commonly used:

- A. Blowing air through the liquid.
- B. Beating the liquid with rotating brush or paddles.
- C. Spraying the liquid into the air.

The last two methods are used on farms today. The first one is the most common in domestic treatment.

### The Oxidation Ditch

The oxidation ditch is an aerobic biological treatment system consisting of a continuous ditch or gutter in which manure is kept in a liquid state. A mechanical device is installed for adding oxygen and circulating the liquid. The aerobic treatment has advantages that include:

- A. Reduction of odours and septic gases.
- B. Reduction in the polluttional potential of the waste.
- C. Reduction of the total volume of manure (through evaporation only).

The advantages of the oxidation ditch as a means of aerobic treatment include:

- A. Simplicity of incorporating it into confinement housing combining manure collection, handling, and treatment in one unit.
- B. Biological treatment is enhanced by the continuous loading achieved by locating it beneath slatted floors.
- C. A minimum of labour and management skills is required.

The oxidation ditch carries on physical and biochemical processes. The majority of the organic waste material is metabolized

through the biochemical actions of microorganisms. In most aeration devices it is the physical stirring and mixing of the liquid with air by the mechanical device that puts oxygen into the liquid and makes it available for the biochemical processes. The mechanical device, the aerator, must also maintain adequate liquid velocity in the ditch so as to keep the solid particle suspended and provide sufficient turbulence for a rapid exchange between microorganisms, organic matter, oxygen, and microbial waste products.

The ditch is usually designed with an overflow to keep the liquid depth constant. Thus, it is a continuous fed, continuous discharge system. After the ditch has operated for several months, the concentration of solids may become too great depending on the manure concentration, the loading rate, the microbial activity, and water wastage. If this is the case, water must be added to the ditch to dilute it to the desired concentration or solids must be removed. The usual methods of aeration involve the use of rotors, pumps, or propellers. The most common aerator has been the rotor, a form of paddle wheel.

The number of aerators to be used depends on the type of aerator, loading rate, the size of the ditch, and the depth at which the liquid is maintained. The number and type of animals determine loading rate which determines the oxygenation capacity of the aerator. The ditch

size, liquid depth, and liquid viscosity affect the size of aerator needed to maintain an adequate liquid velocity for keeping manure solids suspended.

### Compost

Composting is an age-old process recently returned to the fore. Briefly it consists of maintaining an aerobic environment within a pile or stack of semi-dry (40-60 per cent moisture content) organic matter. The organic matter can be plant material or animal manure. Perhaps the best example of animal manure compost is horse manure. Still used for mushroom culture, horse manure is dry enough to allow free passage of air through the mass and at the same time has a good balance between carbon and nitrogen. The carbon to nitrogen ratio (C:N ratio), considered ideal at 30:1 to 35:1, governs whether optimum conversion of soluble organic matter takes place. If the C:N ratio is low, excess nitrogen is given off as ammonia. If the C:N ratio is high, bacterial growth is restricted and stabilization is poor.

Outside of horse manure the most promising material for composting is beef cattle feedlot manure. Such manure is dry enough to compost well and the C:N ratio is about right. Compost experiments with dairy cattle and swine manure have run into snags because of the much higher moisture content and the unfavourable C:N ratio. More bedding would make

(Continued on Page 20.)



# Macdonald Reports

by Joan Habel

## THE SUBJECT WAS CARROTS

A visit with Dr. R. H. Estey, Chairman of the Plant Pathology Department, yielded some interesting information on current work being done in this department toward solving two carrot problems in Quebec.

This vegetable is one of our most important horticultural crops — 10,000 acres of carrots are planted annually, which yield 38 per cent of all the carrots grown in Canada. Production is approximately 145,000,000 pounds, representing an annual farm value of \$5,000,000. So you can see that this is a big business; if the industry runs into trouble with plant disease, researchers must swing into action to solve the problem.

Late in the winter of 1974, an unusual black scurf was reported on carrots which had been grown in Quebec, stored through the fall and winter and shipped to Boston markets. Samples of the infected carrots were sent to Macdonald College, where the disease was identified as a fungus which had never been reported in Canada before. The trouble does not arise in the field or in short storage but after prolonged storage, especially in polythene bags which provide ideal conditions for growth of the disease. (Although black scurf had been seen previously in Britain and Italy, it did not cause enough crop loss to require treatment, probably because the period of storage is usually much shorter in these countries.)

The plant pathologists, working with black scurf of carrots, first

learned how to grow and handle the fungus in the laboratory. The next step was to test various chemical compounds for their effectiveness in checking the disease; finally, concentrations of selected chemicals were decreased to the lowest possible levels for use in the field. Working toward success, pesticide companies are testing products at this time, with very encouraging results in field trials.

The second carrot problem Quebec growers face is that of nematode disease, which is becoming prevalent in the muck soil districts around Ste. Clotilde in the Chateauguay Valley. Damage to crops by this disease can be very serious; in fact, the carrot farms on Ile Jesus were wiped out a few years ago by this problem.

In general, nematodes are widespread in soils from the Arctic to the Antarctic — only insects are more plentiful! Some nematodes are harmless, while others cause diseases in crops; northern root-knot nematode is the variety giving trouble to certain districts in Quebec. Each nematode looks like a tiny eel, about 1/50 of an inch long and is hardly visible because of its white-transparent colour. In large numbers, however, they can be seen. Their effects on carrots are in the growth or pre-harvest stage, causing malformation, which greatly limits the crop for processing or marketing. It should be noted, however, that infected carrots are edible, in much the same way as an apple with a worm in it is edible. Back yard gardeners do not have to throw their crop away for health reasons!

The Plant Pathology Department finds the control of rootknot

nematode difficult because there are so many variables to consider in treatment. Mineral soils (such as clay or sand) present fewer control problems than organic soils (muck) which tend to neutralize chemicals and reduce their effectiveness. Rainfall, water table level, and temperature all play their parts to make uniform control difficult. Before each treatment of the soil with a nematicide, soil analyses for nematode presence and concentration must be conducted. The best approach for control from the standpoint of economics seems to be the use of a nematicide for one year on carrots, then rotation for two years with other non-root crops such as lettuce and onions which are not seriously affected. The nematode population can never be completely destroyed, but it can be held in check to minimize crop losses.

With the hard work of the Plant Pathology Department, problems like the ones mentioned above are being solved — good news for the farming community in Quebec.

## FOOD SCIENCE IS FOR GUYS, TOO!

For several years, the School of Food Science at Macdonald College has been trying to change its image from "for girls only" to one which interests both men and women. The old mental picture of young ladies in aprons or smocks, measuring and mixing and analysing food products, is out of date as more young men begin to realize that there is tremendous career potential for them in the hospitality management field and that one program in the School of Food Science has been designed to train them for





Girls and guys work in a basic nutrition class with Professor F. A. Farmer, School of Food Science.

these careers. Although each year a few male students graduate from this option, there are job opportunities for many more.

The hospitality industry is a broad field, the second largest industry in Quebec and third largest in Canada. It includes all the types of businesses related to offering people accommodation and food: hotels, restaurants, institutions, supply and marketing service are a few examples. Work in this industry is hard, hours are long, vacations are often snatched during off-season for tourists. But it is a people-oriented business, appealing to those who derive satisfaction from helping others.

The most recent of the two options available to students interested in careers in hospitality is the Bachelor of Commerce option in Food Administration. During three years of study, students spend their first and third years in Commerce at McGill, in downtown Montreal, and the middle year in Food Science at Macdonald College. At McGill, they study the administrative and management concepts which apply to the successful running of any business. Their courses at "Mac" are food oriented — quantity food production, layout and planning of physical facilities, basic nutrition, microbiology and sanitation are a few areas studied. As students graduate with a Bachelor of Commerce, the entrance requirements for this option are those for the

Faculty of Management at McGill: a CEGEP diploma in Arts, with emphasis on mathematics. Some background in organic chemistry is desirable for Food Science courses.

The other option is pretty well the reverse of the first, with two years of Food Science at Macdonald College and one at McGill in Commerce. Students entering this program need a CEGEP diploma in Pure and Applied or Health Sciences and, at graduation, receive a Bachelor of Science degree.

In a very practical way, students nowadays are looking for college programs which lead to good job prospects after graduation. In the hospitality industries, permanent and summer employment is plentiful and the future looks excellent. Qualified, trained personnel, both women and *men* are needed in hospitality management. Maybe this is the career for you!

#### HINTS FOR JOB SEEKING

Job opportunities for Agriculture graduates are good — this is the latest word from Mrs. F. Gillan, Counsellor at the Student Placement Office at the College. Looking at the student/employment ratio, there is a job for each person who applies for one, but Mrs. Gillan offers some very positive advice to candidates wishing to enter the agri-business field.

First, bilingualism is becoming essential. Employers from Manitoba right through to the Maritimes have specified in their requirements that applicants should be able to speak and write proficiently in both French and English.

Practical experience on a farm is a second important asset for a candidate seeking a job. Employers feel that a good understanding of farm practice and management is necessary in business; students who did not grow up on farms should plan to spend their summers working for farmers in order to gain background which will help them in their work later on.

"When writing a job and personal resumé, it is no time to be shy." Following Mrs. Gillan's advice, a curriculum vitae should include all of a candidate's accomplishments, however insignificant or unrelated they may seem, so that an employer has a total overview of a student's past experience on which to evaluate his or her potential.

Finally, new graduates should realize that the field of sales in agri-business is a profession. All too often a candidate may scoff at becoming a sales representative in a machinery, fertilizer, or feed company, when in reality this line of work provides the best possible grounding for future advancement.

For young people planning careers in agriculture, the above "helpful hints" could be considered well in advance. For graduating students, a crash course in French or another summer on a farm might help you find a job.



# The Family

# Farm

Published in the interests  
of the farmers of the province  
by the Quebec Department of  
Agriculture.

## TESTING POTATOES FOR FREEDOM FROM DISEASE IN FLORIDA

by Maurice Marcotte and Lionel Lachance of the Plant Productions Division and Jean-Baptiste Roy of the Information Division, Quebec Department of Agriculture.

Revival of potato growing in Quebec implies, to start with, that the growers shall be able to obtain their supplies of healthy seed potatoes within the province. That is why steps have been taken to produce seed potatoes free from decay-causing or other diseases.

The production of disease-free tubers (and the elimination of diseased ones) requires considerable effort by the Quebec Department of Agriculture. In this the Department is assisted by a group of specialized growers in the Lower St. Lawrence region whose work ensures the quality of the seed potatoes they market.

Being aware of this, farmers will find it interesting and rewarding to read the following account of tuber testing for disease-freedom in Florida in 1975-1976 and the results obtained.

### Effects of Disease

It is generally acknowledged that potatoes are among the crops needing continuous attention on the part of the grower. Each year, diseases, insects, and weeds take their toll, depending on the extent to which they are kept under control. Damage from disease is not just a matter of reduced yield: in the case of fungal and bacterial diseases

that is frequently only the beginning. These diseases often spread during the storage period and so help to increase losses.

For potato growers, disease means not only a smaller yield in the fall but also a reduction in quantity and quality during winter storage that is not realized until the potatoes are sorted. The health of seed potatoes may be affected enough to prevent their certification. Virus diseases produce the same effects but to varying degrees according to their presence in the tubers or on the plants in the field.

### Certification and Diseases

The regulations governing certification of seed potatoes are very strict and precise as regards certain diseases. For example, the presence of a single plant infected with bacterial ring rot in a field, or of a single potato with that disease in a lot of potatoes in storage downgrades the whole field or lot, however large, and prevents certification. In fact, the mere presence of bacterial ring rot on the farm is sufficient to condemn the field or lot of potatoes intended for seed. For most of the other diseases, which are considered less infectious, the certification regulations set strict tolerances according to the particular disease and class of seed. The problem is that disease may sometimes be developing inside a tuber and lead to decay some days later.

It is not the certification regulations that are at fault in such cases but the difficulties facing the inspector who has to judge a lot of potatoes by sight. In the case of the commercial,

Certified, Foundation, and Elite III classes, visual examination of plants in the field and of tubers in storage is the sole criterion on which an inspector bases his judgment. Obviously, there are many ways in which physical, biological, and human factors can affect the health of a field of potatoes. The plants grown from these potatoes the following year are therefore on the whole less healthy than was to have been expected at the time of the inspection.

### Methods of Testing for Disease

There are many possible ways to find out whether a lot of tubers is healthy. The presence of disease-causing bacteria, fungi, or viruses can be detected by modern methods. In practice, however, the identification of a diseased plant or tuber is a matter of visual diagnosis based on typical symptoms and the inspector's experience. Bacterial ring rot, black leg, fusarium and verticillium wilts, rhizoctonia, etc. can be detected in this way. The symptoms can be found both on the growing plant and on the tubers although expressed in a different way.

In the case of the **virus diseases** known as leaf roll, mosaics, and spindle tuber, however, the symptoms are comparatively easy to see on the growing plants but are practically absent from the tubers. The problem is made more difficult by the ease with which virus diseases are transmitted from infected plants to healthy ones in a number of ways, for example by insects, implements, and contact. As a result, a plant grown from a healthy tuber may yield virus-bearing tubers which



are impossible for the inspector to detect. Nevertheless, these apparently sound tubers will produce plants showing the symptoms of the disease next year.

Many ways have been tried to put an end to the planting of virus-bearing tubers. There are excellent preventive measures which should not be neglected, such as the use of healthy seed potatoes and suitable growing methods including control of insect vectors such as aphids, and avoidance of injury to tubers at harvest-time. Unfortunately these measures do not ensure absence of virus-infected plants grown from healthy-looking tubers produced by initially healthy plants that have become infected.

The removal of diseased plants from the field (rogueing) is another excellent way to prevent the spread of disease. The presence of leaf roll or mosaic virus in a lot of potatoes or in only one potato can be detected by growing whole potatoes or just a single eye from a potato in the greenhouse during the winter. However, this method (which has been used in Quebec since 1932-35) is very expensive, dependent on the maintenance of artificial conditions, and more suitable for tuber-indexing than for checking commercial lots. Other, more recent means of virus detection, including such techniques as the use of host plants, serums, and various tests, e.g., the IgEL-Lange test and meristem culture, are excellent supplementary methods much used in the production of basic plants, but they are too costly and elaborate to be suitable for checking commercial lots of seed potatoes.

One widely used method of doing such checking is to take representative samples of tubers from storage lots of potatoes and plant them in a warm country during winter. There the resulting plants grow well and under natural conditions, and afford a very good

idea of the percentage of diseased plants that the lot from which the sample was taken would produce in the field next season. Such testing is carried out in Florida, hence the name "Florida trials" or "Health testing in Florida".

### Historical Review and Aims

It appears that during the 1920s, in the State of New York, Dr. Fernald took samples of seed potatoes and grew them in winter in warm places like the Bermudas and, later, Florida.

In 1935-36, thanks to Dr. Bounty, the State of Maine carried out similar trials in Florida because leaf roll was then causing serious trouble. New Brunswick organized such trials in 1946.

Quebec started making trials in Florida in 1966 on the initiative of Mr. Bernard Baribeau, founder of the Elite Seed Potato Station at Manicouagan (now called the Manicouagan Centre). Quebec's participation in these trials became official in November of that year. The first trial was carried out with 5,120 tubers from the Manicouagan Centre in collaboration with the teams from Maine and New Brunswick. The results of January 1967 represented a first field assessment by means of an already recognized method of checking disease.

Parallel trials carried out in the greenhouse on the same plants demonstrated, in the case of leaf roll, that the Florida trials were more accurate than the greenhouse tuber-indexing method. Besides making it possible to grow the plants under natural conditions, the Florida trials also permitted the checking of a comparatively large number of plants or samples during winter.

For these reasons, samples of seed potatoes from the Lower St. Lawrence Multiplication Centre were checked in Florida together with those from the Manicouagan

Centre. Thus, it was possible in January to form a picture of the state of health of the seed potato producers' fields in the coming season. This system of testing for disease meant that a year was saved by means of the two disease checks, one on the summer seed-potato crop in Quebec, the other on the samples in Florida in winter.

The results showed great variation between the samples as regards freedom from disease. It was therefore decided to include the Florida trials in the Lower St-Lawrence seed-potato multiplication program. This made it possible to assess the healthiness of the seed potatoes marketed and also the relative merit of their growers and the incidence of infection by production zones and regions.

In general, the purpose of these Florida trials was to look for visible signs of disease on the plants, including those due to leaf roll virus, mosaics, and spindle tuber. These aims may be summarized under three main headings:

1. Assessing the healthiness of seed potato lots as regards freedom from virus diseases: mosaics, leaf roll and spindle tuber;
2. Checking the health of the basic stocks at the Manicouagan Centre by "hill" or plant indexing (1 or 2 tubers per plant) in view of the less favourable conditions on the North Shore of the St. Lawrence for external expression of certain symptoms;
3. Avoiding use, during the following year, of lots contaminated by virus. Thanks to the trials carried out in winter during the storage period, a year is saved.

### The 1975-76 Trials: Technical Organization, Direction, and Working Arrangements

Since the transfer of the Elite Seed Potato Station from the agricultural department's Research



branch to its Plant Productions division, the Florida trials have come under that division for purposes of technical assistance and services to growers.

### **1. Participating organizations and persons responsible**

Plant Productions Division; Maurice Marcotte  
Manicouagan Centre; Michel Tennier

Seed potato producers of region 1; Marcel Michaud  
Seed Potato Certification Office; Jacques Laganière

### **2. Working arrangements**

1. General direction and supervision: Plant Productions Division;
2. Taking and preparing samples: responsibility of the participating organizations;
3. Numbering of samples: directors of the Division (distribution of numbers);
4. Transport of samples from Manicouagan to Fredericton: responsibility of the Manicouagan Centre;
5. Planting: by hand or by machine depending on the purpose of the trial;

#### **1. Machine-planted samples —**

A two-row tuber-unit table-type planter is used to plant samples when it is desired to obtain an overall figure for the proportion of virus-infected plants in relation to the number of plants which emerge. Samples are planted in two rows of equal length, the start of each sample being marked by a 15-inch stake bearing a code number. A space of 8 to 10 inches is left between samples.

The seed potato producers' samples and those from the Manicouagan Centre on which an overall result is to be based are machine-planted in this way.

The tubers must be as close to 2¼ inches in diameter as possible, without exceeding that

figure, so that the planter will not break the tubers and the plants will be of uniform size.

A team of six persons is needed on the planter to do the work efficiently and another team is required to bring the samples, open the bags, etc.

### **2. Hand-planted samples**

The tubers are numbered and must be planted in (increasing) numerical order. Every fifth tuber is marked by a 12 inch garden label bearing its number.

To give the plants a good start, the tubers must not be less than 2 inches to 2½ inches in diameter.

Prior to planting the numbered tubers, 25 to a mesh bag, are set out in their planting order.

Starting in November, all tubers have to be treated with a chemical to break dormancy. After the samples have been sent to Fredericton, Mr. Stan R. Colpits is responsible for applying this treatment to the samples from Quebec and New Brunswick. After being shipped to Presqu'Isle, Maine, the lots from Maine, New Brunswick, and Quebec are transported to Homestead, Florida, where they will be planted.

Before being planted, the tubers are left outdoors in sacks to encourage growth of short stubby sprouts. Planting is done by the teams from Maine, New Brunswick, and Quebec using Maine's machines. Maine is responsible for soil preparation, maintenance operations, irrigation, and crop protection. The Michigan team's participation is limited to planting its own samples.

Personnel from Quebec who participated in the 1975-76 trials were as follows: During planting in November and December: Michel Tennier from the Manicouagan Centre, Jean-Guy Roy from the Manicouagan Centre. During

note-taking in January: Maurice Marcotte of the Plant Productions Division, Michel Tennier from the Manicouagan Centre.

### **Source of Tubers and Methods of Evaluation**

To be eligible for selection for trial, tubers must satisfy the following basic criteria:

1. come from seed-potato producers in agricultural region 1;
2. come from lots intended exclusively for seed potatoes;
3. come from lots declared fit for certification by the federal inspector;
4. come from an institution or organization (following application to the Plant Productions Division).

The lots chosen for the 1975-76 trials came from three different bodies:

#### **1. The Manicouagan Centre**

In November 1975, 23 samples, each consisting of 200 tubers of the Elite II class and representing 10 different varieties, were planted by machine.

A second group, of 3,280 numbered tubers representing the same number of plants (or "hills") and 15 different varieties, were planted by hand. The other tubers from the parent plants are in storage at Manicouagan and will be used to grow basic plants.

#### **2. The Lower St. Lawrence Multiplication Centre**

Also planted by machine were 35 samples of between 250 and 1,000 tubers each, of the Elite II, Elite III and Foundation Classes, representing 10 varieties and supplied by 27 producers. These samples were taken either from plots or fields planted by tuber units<sup>1</sup> or from the large field planted without regard to tuber units.

<sup>1</sup>A number of eyes or sprouts taken from a single tuber and planted in a row as a unit.



### 3. The Seed Potato Certification Office

A lot of 142 numbered tubers representing two varieties were supplied by the Seed Potato Certification Office at La Pocatière.

An additional 14 samples of between four and 40 tubers each representing six varieties completed our plantings. All of these tubers were planted by hand.

#### Note-Taking

The system of evaluation takes into account the mode of planting.

#### 1. Tuber samples planted by machine

In the case of machine-planted samples, note-taking involves: counting the number of plants which have emerged with a view to calculating percentages; examining plants at least three times to discover diseased specimens, the number of plants showing symptoms of virus disease, and the type of virus; comparative evaluation of each sample as regards general appearance and uniformity and vigour of growth.

The proportion of virus infected plants is calculated as a percentage of the number that are growing.

#### 2. Tuber samples planted by hand

Here, the system of taking notes consists in examining each plant in turn in order to: ensure that it corresponds to the tuber in the ground; judge it to decide whether its appearance, development, vigour and state of health are in keeping with the variety; identify new plants which have emerged since the last inspection and individually judge those that are sufficiently developed.

Notes are taken at least four times on each plant and, in view of the possibly serious consequences of a decision, certain doubtful cases are reviewed before being made final.

#### Reliability of the Method

On the whole, the reliability of the method depends as much on the competence and skill of those who examine the plants as it does on the degree to which the symptoms of virus disease are expressed. Hence:

— a training period in the environment where the trials are conducted in Florida is essential. For example, Maine requires a new employee to have had three years training before he is entrusted with the responsibility of note-taking. In this connection, emphasis is placed on detection of spindle tuber;

— faced with a small percentage of virus-infected plants (for instance, two plants in 600), note takers are expected to reach the

same conclusion. However, if the sample contains over five per cent of virus-infected plants, some latitude is allowed (to the extent of a few plants).

— in order to ensure detection, notes must be taken by at least two persons.

It is very desirable for an inspector from the Seed Potato Certification Office to participate in judging the lots. Thanks to the knowledge thus gained he can, to some extent, decide how far the results obtained in Florida agree with those of the field inspections.

#### Results

The following tables show results obtained from different groups of samples.

#### 1. Producers' samples

Table 1 shows the performance of producers' samples. If we leave out the variety Green Mountain, the general tendency is for Elite

TABLE 1 Health Trial Results by Variety (Seed Potato Producers Samples Tested in Florida)

Variety	Number of Acres Represented	Class	Number of Producers	Virus Diseases			
				Percentage of Infected Plants (range)	Number of Samples		
					0 to 2%	2.1% to 4%	4.1% or over
Norland	25.5	E-III	6	0.78 to 14.2%	3	2	1
	20.25	E-III	1	0.88 to 0.9%	2	—	—
Kennebec	152.5	Foundation	10	0.2 to 36.7%	3	4	4
	0.25	E-II	1	13.2%	—	—	1
Green Mountain	15.0	E-III	2	13.2 to 22.5%	—	—	3
Keswick	20.7	E-III	2	0.14 to 1.38%	2	—	—
Katahdin	19.5	E-III	2	1.58 to 4.2%	1	—	1
Netted Gem	2.5	E-III	1	4.57%	—	—	1
Superior	18.0	Foundation	2	2.77 to 5.96%	—	1	1
Avon	3.0	E-III	1	1.9%	—	1	—
Belleisle	1.75	Foundation	2	0.0 to 9.27%	1	—	1
	5.5	E-III	1	0.58%	1	—	—
Sebago	5.0	Foundation	1	1.82%	1	—	—



III class samples to have a smaller percentage of virus-infected plants than Foundation class samples. It will also be noted that in only a few samples is the proportion of virus-infected plants less than 0.5 per cent (or five plants in 1,000). This doubtless reflects incomplete protection against insects during the growing season. Although there are not enough samples per class and variety, it is clear that the number with over four per cent of virus-infected plants (i.e., 13 samples out of 35) is too large.

In general, Kennebec (Foundation class) and Green Mountain are the two varieties mainly responsible for this.

It was found (when there were enough samples to draw conclusions from) that, for the same class of a variety, the number of virus-infected plants varied greatly from one grower to another. Planting by tuber units within samples did not seem to alter the percentage of infected plants. In any case, too few samples came from plots or fields so planted. It appears that there

is much more virus infection in some regions than in others.

## 2. Samples from Manicouagan (machine-planted)

Samples from each Elite II class field at the Manicouagan Centre are tested in Florida (see Table 2). They are planted by tuber units. For Nordand, Red Pontiac, Kennebec, Katahdin, Avon, and Irish Cobbler the results are "excellent". For Netted Gem and Sebago they are rated as "good" because there were a few virus-infected plants. Only Green Mountain, a variety which is recognized as not being virus-free, showed poor results. It should be noted, however, that these Manicouagan samples were judged much more severely than the seed-potato producers' samples.

## 3. Hand-planted samples

Each tuber represents a definite number of plants or tubers. Presentation of the more complicated results for 3,280 tubers would not give a clearer idea of the work.

Moreover these stock plants originate partly from virus-free plants. Out of a total of 2,081 Kennebec tubers planted in Florida, four plants showed symptoms of leaf roll. Some other varieties produced one or two virus-infected plants, while Sebago, Keswick, Avon, York, Red Pontiac, Chieftain, Netted Gem, Norchip, Pungo, and Norland showed no signs of infection.

The Seed Potato Certification Office also sent a number of tubers, namely 172 individual ones and 14 lots containing from four to 40. These were tubers which had been subjected to various treatments and the results will be sent to the persons concerned.

## Conclusion

All seed-potato producers who submitted samples for these trials are to be sincerely congratulated. Even if some of the stocks were not as healthy as might be wished, the effort made by each producer helps to improve the production and quality of seed potatoes in the long run. The enterprise of the Lower St. Lawrence producers should be better known. They will become increasingly efficient if their efforts are disciplined and directed towards a common goal, i.e., the production of seed potatoes of excellent quality from the health standpoint.

A project like the Florida trials is only possible through the collaboration of the persons concerned working in the different organizations involved, namely the growers of the Eastern Quebec Seed Potato Producers' Association, technicians, agronomes, and the Quebec Department of Agriculture, and the Seed Potato Certification Office. Sincere thanks are extended to all these collaborators.

TABLE 2 Health Trial Results (Machine-Planted Samples From Manicouagan Centre Tested in Florida)

Variety	Number of Acres	Class	Number of Samples	Result
Norland.....	3.55	E-II	3	Excellent (0.0%)
Red Pontiac.....	0.58	E-II	1	Excellent (0.0%)
Kennebec.....	9.15	E-II	5	Excellent (0.0%)
Green Mountain.....	4.11	E-II	3	Poor (2.4%)
Keswick.....	3.91	E-II	3	Very Good (0.18%)
Katahdin.....	2.21	E-II	2	Excellent (0.0%)
Netted Gem.....	0.83	E-II	2	Good (0.8%)
Avon.....	0.48	E-II	1	Excellent (0.0%)
Irish Cobbler.....	0.41	E-II	1	Excellent (0.0%)
Sebago.....	2.83	E-II	2	Good (0.8%)

Excellent — 0.0%	Very Good — 0.5% or less	Good — 0.51 to 1.0	Poor — 1.1 to 3.0%
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# QWI

## Annual Convention

The Annual Convention of the Quebec Women's Institutes will take place at Macdonald College on May 25, 26, 27, and 28. The Executive Meeting will be on the 25th, the Board Meeting on the 26th, and Open Convention on the 27th and 28th. The QWI will be celebrating the 65th Anniversary of its founding and thus the Convention theme "Reflect with Pride — Look Forward with Courage." WI members travelling in Quebec are welcome to visit us during Convention.

## Comparative Shopping Program

In September 1974, the **Marcil** branch of QWI (Bonaventure County) expressed an interest in providing comparative shopping information over the local radio station. By June 1975, several conferences had been held with the director of CHNC New Carlisle. As a result, each week, a local housewife and broadcaster, Mrs. Irene Dallain, tours the local grocery stores in the region and gives a short broadcast in French and, later in the evening, in English highlighting the "good buys". She compares sizes and quality and occasionally the prices for a complete shopping list in several stores.

Most of the stores are happy to cooperate by listing their specials ahead of displays for Mrs. Dallain and by sending her their lists of specials each week.

The radio station donates the time to the WI and provides Mrs. Dallain with a weekly amount to cover gas for her car. The Bonaventure County, at its con-

vention, contributed to some of Mrs. Dallain's expenses and the Marcil branch contributes a small sum on a weekly basis. Two other local organizations also help out with expenses.

As the area served is a wide one, it involves a lot of driving to cover it all, and Mrs. Dallain does this as she is able.

## A Method of Fund Raising

An unusual way of raising funds comes from the **Sutton** WI in Brome County and is called "Our WI 197- Money Sock".

A brightly coloured sock is made from cotton or jersey material and is about five inches long in the foot and three inches by five inches in the leg. Inside is a "poem" re each month of the year. The person receiving the sock puts pennies into it accordingly, i.e., one penny to start the year, 14 cents for February (St. Valentine's), 17 cents in March (St. Patrick's Day), pennies on your birthday according to your years, 31 cents in October for Halloween and so on through the year. At the end of the year the socks are handed in and a tidy sum is realized. This idea could be used for sunny days of the year.

## Preparing For Retirement

The world over, people are living longer than ever before. This year more men and women will reach 65, 70, or 75 than in any one year since the beginning of time. The problems associated with our "senior citizens" are, therefore, problems which will increase, not diminish, as the years pass. One

of the most vital problems has to do with education — the educating of those still in the prime of life, in preparation for the days ahead. A happy retirement depends on a planned retirement.

Fortunately, educating oneself for eventual retirement is becoming less difficult. Today, opportunities exist for self-improvement where not so long ago there were none. The man or woman in business, who knows that life in its present day-to-day form must come to a sudden halt at a pre-set date, should take steps to plan for that event years, not months, ahead. Many still in their early fifties, even in their forties, looking far ahead, already have a program. When retirement finally arrives, they will have a purpose in living. An old proverb says: "To live forever, get a cause."

There has to be a reason for continued existence, and the individual, by preparing intelligently for the later years, can help himself and society to work out a satisfactory answer to the problem.

Educating oneself for retirement need not and, indeed, should not become a chore. The secret is to settle upon something which seems to have special appeal. This may take some time and we may find ourselves trying and discarding ideas. The day will come, however, when we uncover an interest, a hobby, a talent, or an inclination that will lead to happiness or self-expression.

There are such widely diverse avocations as photography or book-binding, furniture restoring or coin collecting, poultry raising



or the study of a foreign language. short story writing or breeding of canaries, wood-carving or painting. The list is endless, and no suggestion need be ruled out because it sounds slightly silly, or quite impossible. If you have your heart set on learning the harp, growing a new strain of tuberoses, or raising French poodles for the luxury trade, go ahead and try, regardless of what others may say! Furthermore, there is nothing that says you must have only one new interest at a time. Gardening might well occupy your entire available time for six or eight months of the year, but you will find yourself approaching it with renewed vigour if you transfer your energies to a different sphere of activity during the winter.

Not everyone will need to search far to find a rewarding interest. Many will find it possible to continue, if only in a modified way, the line of work in which they have been interested since youth. Some will adapt their spare time hobby of years past and build it into a trade which pays off. Others may have always had a secret, or not-so-secret, desire to try something "sometime" when there is more time. Here is the opportunity, if only we recognize it. There is no time like the present. It is later than we think.

Even those who are approaching the years of retirement incapacitated by indifferent health are finding it possible to help themselves through help to others. Few of us reach our 60s without some minor handicap. Fortunately, medical science today is able to lessen many disabilities or to prevent further deterioration. However, even those who are beyond such assistance have been helped to forget their burden. These men and women have found an opportunity to do good within the limits of their ability. The knowledge that they are

contributing in a small way to make the world a better place can work wonders in improving mental attitudes and lengthening the lifespan.

It is not easy for those in their forties or fifties to look ahead some 20 years. The sudden transition from the rapid tempo of business life to the comparative serenity of our sunset years is a wide gap to bridge. Yet it must be bridged if we are to meet the future properly prepared. What type of self-education we decide to undertake matters little. The important step is to undertake something, and soon. Then we can move forward with life, eager to face each day that lies ahead.

Mrs. Merlin Lewis  
Convener of Welfare and Health.

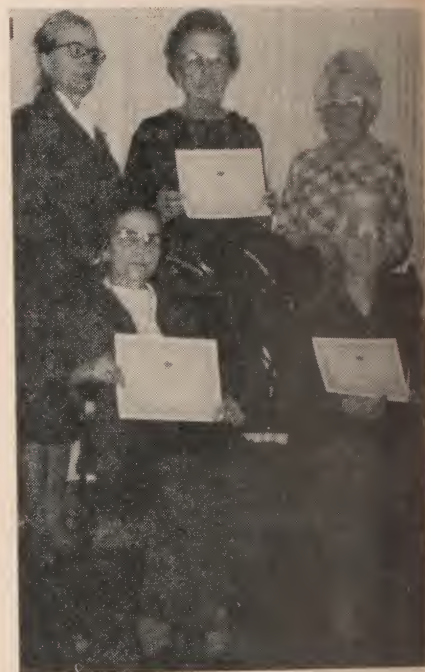
#### Recent News from Pontiac

**Wyman** members are community minded and have donated to hot lunch equipment in the school. Donations had been sent to the local hospital and to a neighbour whose home was burnt. A donation in memory of a deceased member was sent to a senior citizen's home.

The branch received an interesting letter from Australia through stamps they had sent to the ACWW Conference in 1974.

**Quyon** was busy with centennial celebrations last year. They sold centennial pens for the committee and held a tea one day during centennial week. At present they are working on the old school building to make a WI hall. A bale of used clothing was collected and sent to the Unitarian Service Committee.

**Fort Coulonge** members have been encouraging good handwriting in their school and gave a prize for penmanship to competing pupils. It is wonderful what can be made from discarded



Mrs. H. R. Rabb recently presented three Wyman members with Life Membership pins and certificates. Standing left to right: Mrs. Rabb, Mrs. James Campbell, and Mrs. S. W. MacKechnie, who received her Life Membership in 1953 and a 50-year bar in 1974. Seated: Mrs. Melvin Stewart, who received her 50-year bar in 1975, and Mrs. S. McNeil.

articles as the **Beechgrove** members discovered recently when they had a demonstration on this. Fair time will be coming soon and **Stark's Corners** are already making plans for exhibits.

Three new members have joined **Clarendon WI**, and their membership is now 31. Several members enjoyed attending an Information Day for Women — a joint provincial and federal government project. The ladies bake for night lunches and sew for the County hospital and the Memorial Home. Funds were raised when the branch catered for a Steam show and for Information Day for Men at the annual meeting of the Pontiac Agricultural Society. A very enjoyable evening was held recently when members had their annual potluck supper with their husbands as guests. The highlight of the evening was a program of slides on Scandinavia. "They were very much enjoyed by all, as most of us will never see these places any other way."



## Agriculture

Spring has arrived and by now most of us have received our seed catalogues urging us to grow larger and better gardens.

As I started through the book, I was filled with great enthusiasm. Why, you can even plant fantastic seed tapes. The rows are straight, come up evenly, and need no weeding. Then there is the new miracle pill that takes all the guesswork and confusion out of fertilizer application. I wonder, "What's next?"

Now, I must be realistic. What vegetables and plants suit our climate best? Are we planting for ourselves, or wouldn't it be nice to be able to share with our friends and neighbours?

Then what is more beautiful and rewarding than a rose garden proudly displaying the new Adelaide Hoodless rose which blooms continuously from June to the autumn frost. Several Institute members have reported planting these and are pleased with the results.

Have you ever considered an herb garden? They can be grown outdoors during the summer and indoors in the winter. A kit consisting of eight popular varieties can be purchased through the seed catalogue, as well as a recipe book that utilizes herbs.

This is the time of year for our Institutes to sponsor school fairs by supplying the students with seeds and by encouraging them.

But before we start all our spring planting, we will have time to enjoy the maple syrup for which Quebec is noted. What can be better than piping hot pancakes with fresh maple syrup, or maple sugar or that icing made with the fresh syrup?

Those of us who attended the annual meeting of the Quebec Farmers Association had the

pleasure of hearing the Hon. Kevin Drummond, Minister of Agriculture for Quebec. He discussed several problems that the Department of Agriculture is dealing with at the present time. These include the regulations regarding abattoirs, the beef industry in Quebec and the need for a stabilization program, the modernization of dairies, Crop Insurance Act amendments, the Agricultural Land Zoning Act, and the difficulty in information being printed in French when many of those receiving it are English.

Recently our local agronome told us that the provincial and the federal governments are working on a joint program for a guaranteed income for farmers.

I cannot stress too strongly the need for farm safety. With spring work many tractor accidents occur. Please be very careful of small children being allowed close to the machinery.

And let us not forget to feed our friends, the birds.

Ina Kilgour,  
Provincial Agriculture Convener.

### Dear WI Members:

In spite of cold and snowy weather as I write this, we feel spring is not far away. Farmers are getting ready for sugaring, the crows are back, and the odd day goes over 5°C. Valentine Day is past and many Valentine suppers were held and social evenings for husbands and friends enjoyed. Shut-ins and people in homes were remembered. Preserves and jams are still being sent to Senior Citizens' residences. **Port Daniel** sent 70 jars to one home and **Bonaventure** is knitting an afghan for another. Two members from **Canterbury** visited their seniors and took treats. Fruit, bread, and flowers have also been taken to shut-ins in various places.

Contacts with other places are always interesting. **Sutton WI** made and sent a scrapbook to New Zealand; they had previously enjoyed one from there. **Cowansville** shared a letter from a pen pal in P.E.I. Their County President, a guest speaker at a meeting, spoke on WI work and said, "WI sets the example, world-wide, for working together, no matter what the race or background." Trips to Florida and to Europe with slides and souvenirs adding to the interest have been enjoyed.

Some talks and discussions have included care of senior citizens, the metric system, the Bank of Commerce Senior Key Account — a package of services free to the over 60s — retirement planning, food preparation, cooking and storing, the problems and solutions of organizing and running a community library. One Home Economic Convener spoke on ultra suede, a new fabric, which sews well and has many desirable qualities but is still rather expensive.

The library in Magog, to which members in **Austin** contribute, now has two paid librarians and 15 volunteers. It is open 16 hours each week and has books in both French and English.

A publicity program in **East Clifton** began with a lecture on the principles and techniques of advertising design — with an exhibit of posters made by a college student for a design project. The word "Publicity" was defined and related to the motto "Be not simply good, but good for something." Members were asked to name important personal traits, in relation to the definition and motto, which enhance their lives on a personal and social level. Some traits mentioned: integrity, friendliness, Godliness, common sense, sense of humour, personal appearance.

A poster contest was held and subjects covered ecology, com-



munity, WI activities, and events. The winner, Mrs. Irwin McBurney, received a potted plant in a gold macramé hanger. She made a collage poster advertising a WI event.

Other speakers heard by this Institute were Muriel Watson, RN, a school nurse for the area who spoke on nutrition and said many malnourished persons in our rich, plentiful society were that way because of poor eating habits over a long period. Quality and quantity of diet should be regulated from infancy into late years; Mrs. Talbot and the Reverend Fairbairn spoke on a health centre for the area — the facilities needed, regulations, functions, and benefits were discussed. Active question and answer periods followed all speakers.

Mr. Frank Ball spoke in **Bury** on the life cycle and problems of the spruce budworm. This is a serious problem and letters were sent to the Minister of Lands and Forests, the Town Council and the County MNA re help to spray the trees.

Miss Watson, a retired nurse, was guest speaker in **Dunham**. Her subject was "youth with a mission." She spoke on the history of Dunham Ladies College. The WI holds their meetings in this building.

Another RN, Mrs. McLeod told **Brompton Road** members about the Nursing Assistants course she teaches at the Regional High School. This WI has been renovating the basement under their hall and the work is progressing very well. Money for their project has been raised by holding card parties.

Most of us seem to have more time for handicrafts in the winter and many members have been knitting for the Canadian Save the Children Fund. Others have made articles and afghans to sell or donate. Among these was a quilt pieced by an 85-year-old member of the **Dunham** WI. A few gifts for the P.E.I. Convention sale table have been handed in. We enjoy contests and quizzes at our meetings and **Fordyce** members held one pertaining to

parts of the body which could also have another meaning, i.e., farm animal — calf. This WI had made drapes for their Elementary School last year and were pleased to hear that the school, in appreciation, had given a donation to the local Brownie group. **Canterbury's** contest was remembering what had been done for others in the past year.

Donations have been coming in for the repairs to the Hoodless Homestead, and Save Sight and various scholarships and bursary funds have been remembered.

Some interesting roll calls: Exchange of house plants; casserole recipes; a display or an article in a local museum (no two answers alike); bring something sentimental (a skirt made from material woven by the member's grandfather, 21st birthday gifts were some mentioned); what to bring to a sick friend.

Mrs. James Robertson  
QWI Publicity

*(Continued from Page 9.)*

composting these materials possible but certainly increases the cost if it was available.

Beside the research on making compost, there have been a number of full scale and pilot plant studies. From the engineering angle, the power to turn and mix windrows of composting material is the most important. There are such devices on the market but at \$30,000 to \$50,000 each, a large quantity of material is needed to keep the cost down. The main problem is lack of a market for the final product. One big (20,000 head) feedlot in Ohio has to fortify its material with artificial fertilizer to find buyers.

A pilot plant at the University of Guelph mixed poultry manure with municipal garbage and because of the offsetting C:N ratios

turned out some good compost. The joint solution, one for the poultry farmer without land and the other for the municipality helps our pollution problem. From the poultryman's viewpoint here is a way of getting rid of manure he cannot use. For the municipality it is a method of stabilizing a material that is difficult to handle in a landfill site.

### Research at Macdonald

Aside from the research on injectors, our present work concentrates on aerators and aeration. Our aeration basin is enclosed in a Brace Institute-type greenhouse. Such a greenhouse gives us the opportunity to study the structure as well as control the environment around the aeration basin. The oxidation ditch is designed for long term aeration

but we want to aerate this manure as little as possible. We call this minimum aeration. It is designed to maintain an aerobic liquid only as long as necessary and then irrigate it onto land. Our experiments have shown that aeration for a day or less is all that is required to make the manure nearly odour free. Within this structure we also have a small methane digester. It is of the type designed in India for small daily loadings. The research on this unit, supported by the Brace Research Institute, should give us more information on the temperature and controls necessary for good operation. Much experimentation work is going on in the United States on methane production from animal manure. We will attempt to keep you abreast of this research in future Journal articles.





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